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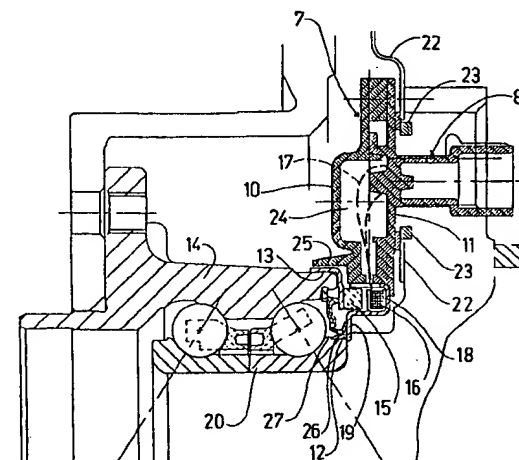
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(54) **A protective housing for a sensor mounted in a bearing, with a cable delivering appendix and connector.**

(57) This invention relates to a protective shell for devices for measuring the revolving speed between the races of a vehicle hub bearing. The shell is formed by a body (6) with a substantially annular shape, mounted frontally on the fixed race (20) of the bearing and facing a phonic wheel (15) mounted on the rotating race (14) of the bearing. An appendix (7) projects radially from the body (6) and is provided with an axially disposed connector (8) for the electrical connection between the coil (16) of the sensor and the vehicle's processing unit.



**FIG. 2**

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This invention relates to a protective shell with an appendix for delivering cables of devices for gauging the revolving speed between the races of a wheel bearing.

High precision gauging systems of the kind known as ABS, that are usually located near the races of a bearing, are ordinarily equipped with basic components. The main components are a phonic wheel, a gauging sensor, a local processing unit and a oleodynamic shunt connection unit.

Since these are high precision systems, they have to be provided with protection devices that guarantee correct operation. Heretofore the basic components must be kept in a steady and correct position, and the electric parts ought to have efficient connections.

All parts have to be protected from external polluting agents so as to ensure the gauging device good operation in time.

It is a general object of the present invention to provide a device that is capable of satisfying the protection and steadiness requirements of the interested parts, with particular attention for the electric connection between the gauging sensor and the local processing unit, so that the cable housing acts as a strong and protective shell with respect to the environment.

With the above and other objects in view which will appear as the description proceeds, this invention resides in a novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein disclosed invention may be made as come within the scope of the claims.

The accompanying drawings illustrate one complete example of a preferred embodiment of the invention constructed according to the best mode so far devised for the practical application of the principles thereof, and in which:

fig. 1 is a radial sectional view of a rolling contact bearing for the wheel hub of a vehicle equipped with the protective shell of this invention;

fig. 2 is a fragmentary sectional view, on a larger scale, of a detail in fig. 1;

fig. 3 is a side view of the shell as seen according to arrow A of fig. 1.

Referring now more particularly to the accompanying drawings, in figures 1 and 2 the protective shell of this invention is formed by a substantially annular shaped body 6, fitted with a radial appendix 7 that is on turn provided with an axially disposed connector 8. The body 6 is represented by the whole formed by an outer half-shell 10 and an inner half-shell 11, that both have a substantially annular shape and diametrical cross section which

are so shaped as to be steadily secured to the fixed part of the bearing and to contain and protect the gauging sensor and the cables leaving therefrom.

Referring to fig. 2, a rigid shield 13 is fixed to the outer rotating race 14 of the bearing. The shield 13 carries a phonic wheel 15 that revolves together with outer race 14.

A gauging coil 16 facing the race 14 is electrically connected to local processing unit (not shown in the drawings) through cables 17.

The coil 16 is arranged within a ring 18 with a C shaped cross section, that is integral with shield 19. The latter is in turn mounted on the inner fixed race 20 of the bearing by means of a circular appendix 12. This appendix is fixed on a notch 26 expressly obtained for receiving the appendix 12 of shield 19. The notch 26 ends with a relief 27 that locks screen 19 axially.

The connector 8, substantially cylindrical in shape with a horizontal axis, is obtained as a whole with the outer half-shell 11 in correspondence of the radial appendix 7. The cables 17 leading to the local processing unit are inserted through said connector. The inner half-shell 11 is mounted on the race 18 along its circumference and is secured both axially and radially by a fixed shield 22. The locking action is improved by means of a rubber washer 23, so as to prevent the shield 22 from transmitting vibrations to the half-shell 11, and by peripheral pins. 29 (figure 3) that unite the two half-shells and secure them to shield 22.

The outer half-shell 10 faces the inner half-shell 11 and is connected thereto as stated hereinabove. In correspondence of the appendix 7, the central part of the outer half-shell is externally convex so as to define a groove 24 meant to facilitate the passage of the cables 17 in the connector 8 and protect them. A tongue 25 projects externally from the half-shell 10 for protecting the phonic wheel 15. As for the half-shell 11, also the outer one 10 is fixed to the ring 18, surrounding it along the whole of its circumference. Two rubber washers (not shown) are so secured inside groove 24 in correspondence of the inlet of cables 17 in appendix 7 as to guarantee the sealing at the inside of said groove and of the connector 8.

As it can be appreciated, the characteristics of the shell offer two principal advantages:

- 1) the shell forms a housing for the cables, protecting them from vibrations, high temperatures and external polluting agents that could compromise good operation;
- 2) the shell is a rigid member that cooperates in preventing the ring 18 from deformation.

As a matter of fact, such ring should maintain its own original arrangement without altering the reciprocal position between the gauging coil 16

therein fitted and the rotating phonic wheel that is facing it.

The shell of this invention has moreover the advantage of comprising the connector as an integral part, therefore reducing costs and time during assembling.

A device for gauging the revolving speed of the races which is provided with the protective shell hereinabove described will be highly reliable and precise for a longer time.

The embodiment shown in the drawings is not the only one possible. The shell can also be made as a whole instead of realizing two pieces to be jointed later, achieving the same advantages offered by the embodiment shown in the drawings.

### Claims

1. A protective shell for devices for gauging the revolving speed between the races of a vehicle hub bearing, characterized in that it is formed by a body (6) with a substantially annular shape, mounted frontally on the fixed race (20) of the bearing and facing a phonic wheel (15) mounted on the rotating race (14) of the bearing; an appendix (7) projects radially from the body (6) and is provided with an axially disposed connector (8) for the electrical connection between the coil (16) of the sensor and the vehicle's processing unit.
2. A shell according to claim 1, characterized in that the surface of the annular body (6) facing the inner part of the vehicle rests upon a fixed ring (18) that carries the gauging sensor (16) and is blocked by a rigid shield (22) integral with the inner fixed race (20) of the bearing; the surface of the annular body (6) facing the outer part of the vehicle rests on the same fixed ring (18) carrying the gauging sensor (16) and is provided with a convex portion determining a groove (24) comprised between said surfaces intended for receiving the cables (17) connecting the sensor (16) of said gauging device and said local processing unit.
3. A shell according to claim 2 characterized in that the annular body (6) is provided with a tongue (25) projecting outwardly in proximity of the rotating race (14) of the bearing for protecting said speed gauging device.
4. A shell according to claim 1 characterized in that it is formed by two half-shells (10, 11), preferably made out of plastic material, of which the innermost (11), the radial appendix (7) and the axial connector (8) form a solid unit.
5. A shell according to claim 1, characterized in that the annular body (6), the radial appendix (7) and the axial connector (8) are realized in one pressed piece.

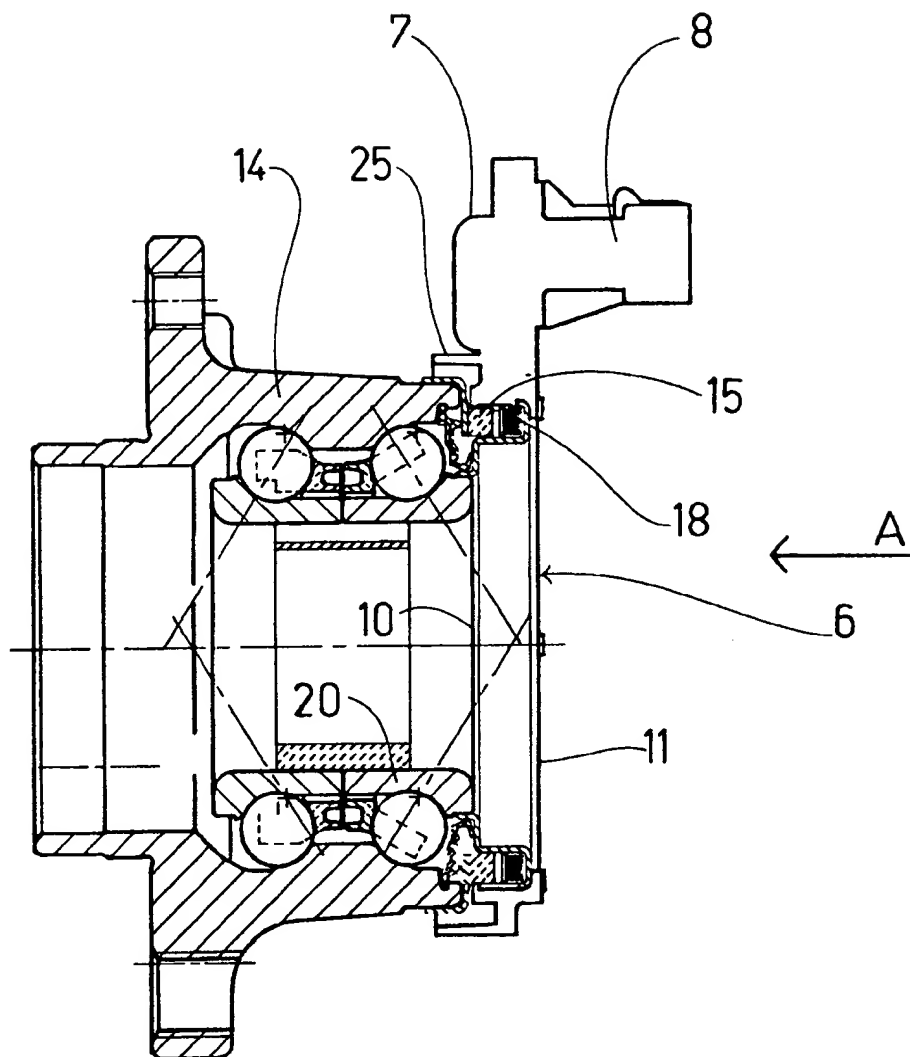


FIG.1

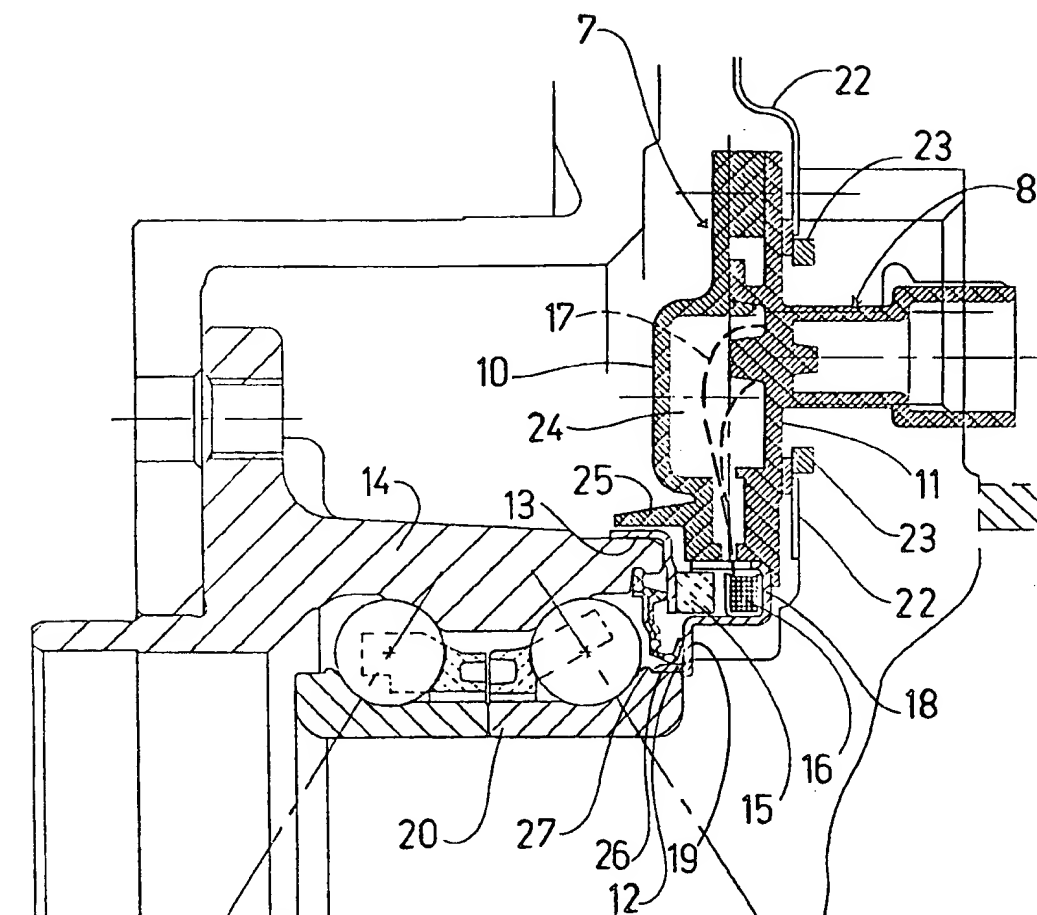


FIG. 2

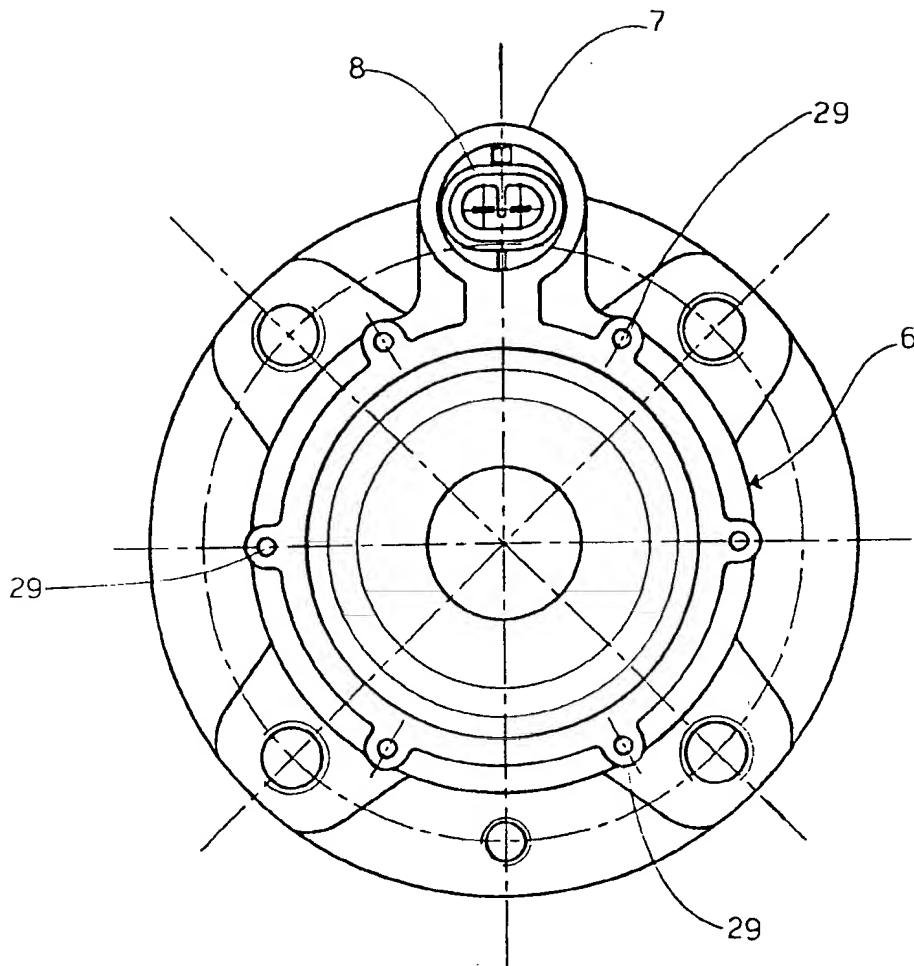


FIG. 3



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## EUROPEAN SEARCH REPORT

Application Number

EP 92 10 1519

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	EP-A-0 401 464 (KOYO SEIKO) * abstract; figure 1 * ----	1,5	G01P3/44 G01P1/02
A	FR-A-2 133 955 (SKF) * page 2, line 18 - page 3, line 20 * * figures 1,2 * ----	1,5	
A	EP-A-0 378 939 (SNR ROULEMENTS) * abstract; figure 3 * ----	1,5	
A	EP-A-0 376 771 (SNR ROULEMENTS) * abstract; figures 1,2 * -----	1,5	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			G01P
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 12 MAY 1992	Examiner JONSSON P. O.
<b>CATEGORY OF CITED DOCUMENTS</b> X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document  T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document			